

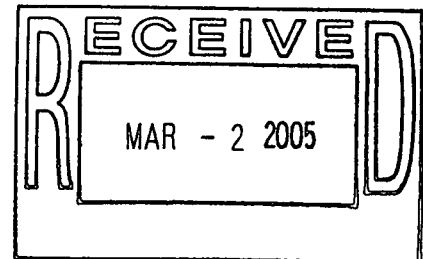
Rocky Flats Environmental Technology Site

**Building
776/777
1st Floor
In-process/Final
Survey Report**

**Survey Unit:
776006**

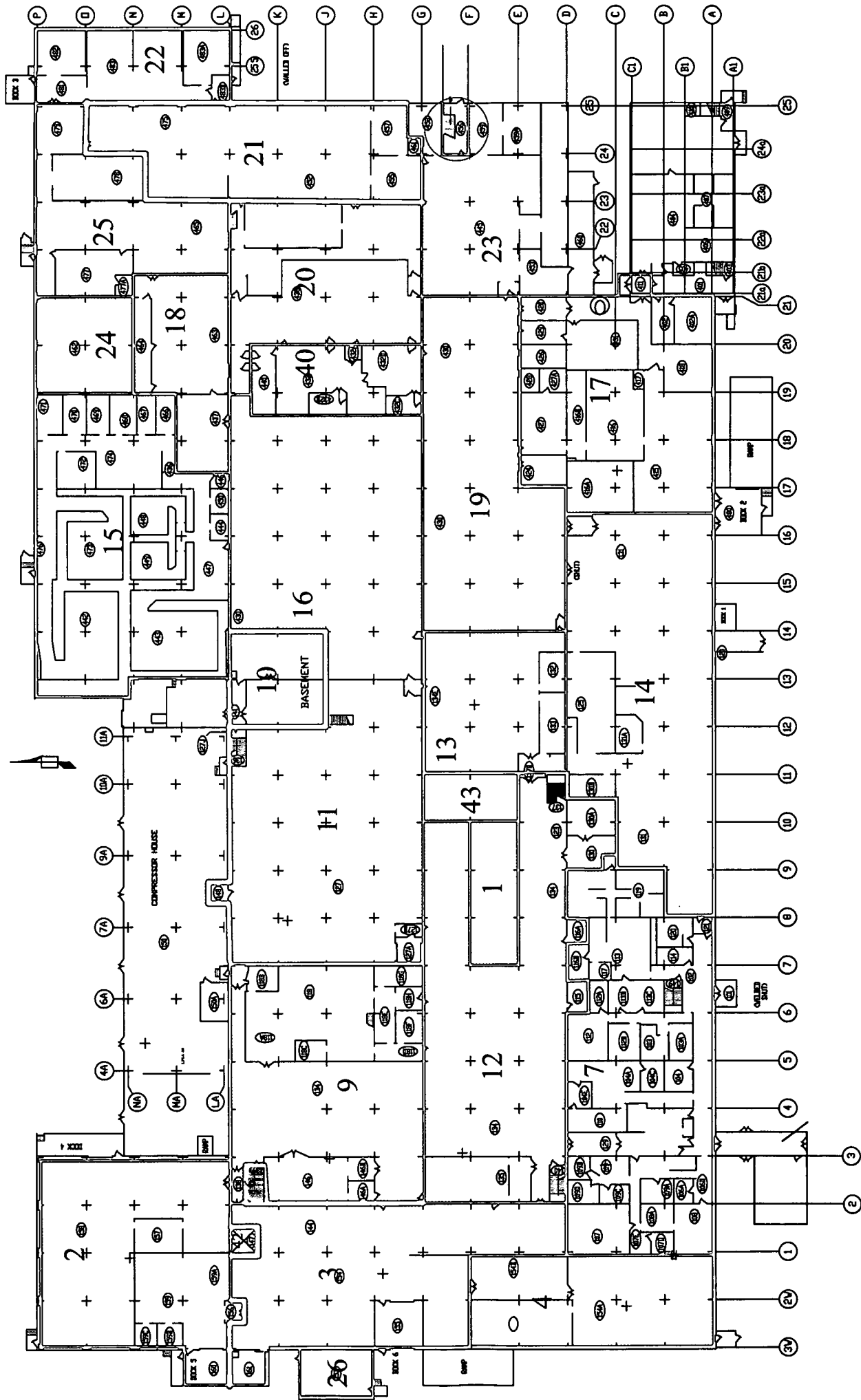
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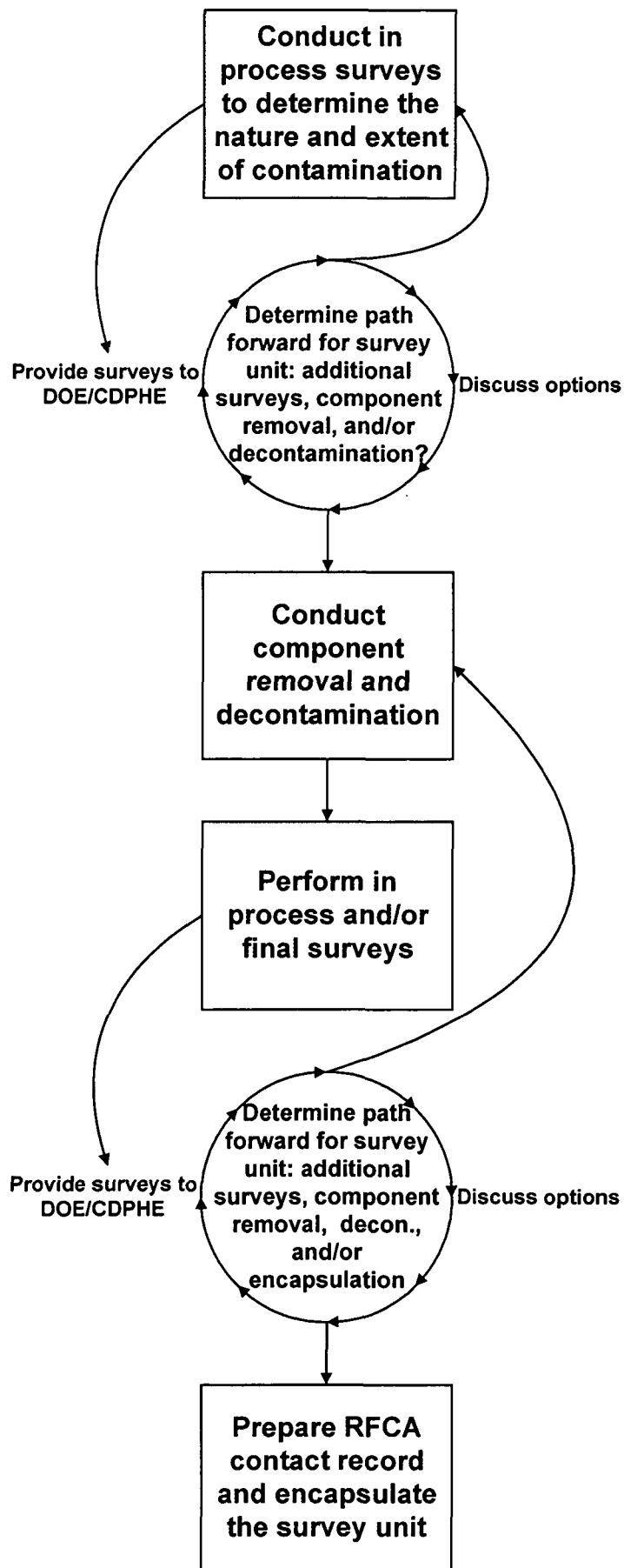
January 2005



ADMIN RECORD

B776/777 SURVEY UNIT 776006
1st FLOOR





In-Process Survey Instructions

Survey Unit 776006

Purpose:

This instruction provides guidance for collecting data needed to determine the contamination levels in Survey unit 776006. Work to be performed in accordance with "INS-535-Ludlum2350-1 with Sodium Iodide Detector" and. RSP-7.01 and 7.02.

Equipment and materials:

- 1) A Bicron G-5 detector (G-5) attached to a Ludlum 2350-1.
- 2) A Ludlum 44-17 detector (44-17) attached to a Ludlum 2350-1.
- 3) Probe holders for the G-5 and the 44-17 with tin side shield (side shield optional for the G-5).
- 4) Electra with attached DP-6, calibrated and daily response checked.
- 5) Access to a SAC-4 that has daily performance checks completed.

Procedure:

- 1) Inspect instruments for obvious damage and perform battery checks, as required.
- 2) Ensure the Nal instruments (G-5 and 44-17) are functioning by using Americium-241 source TS-912, counting the source for 60 seconds. Record readings from before and after survey (i.e., beginning and end of shift) on the daily response check sheet.
- 3) Obtain background measurements for floors, cement walls with Nal detectors in room 119 near column C-9 or near Column A-5 in room 106B on the 1st floor of B-776. For ceilings take background measurement as specified below.
 - ✓ For floors and cement walls, place the detector (G-5 preferred or 44-17) in holder, 30 cm from floor and perform background measurement.
 - ✓ For block walls, place the detector (44-17 preferred or G-5) in holder, 30 cm from wall and perform background measurement.
 - ✓ For ceilings and Metal Stairs, background measurements will be taken in room 106B near column C-9. Point probe towards ceiling, hold probe at waist. Place thin metal sheet over top of detector. Ensure that tin back shield covers back of probe, perform background measurement.

Perform 60-second count for all background measurements. Record all results in the designated space on the data collection sheet (this may be the remarks section).

4) All areas marked on the attached maps should be scanned. Scan over the entire surface of each grid or step by holding the detector within 6 inches of the surface. Scan rate should be about 1 foot per second. Listen for change in count rate. Locate the point that has the highest reading in the area and take the measurement at that point (sample location). If no elevated reading is detected during the initial scan, then use professional judgement to select sample location most likely to be contaminated in the grid and take the measurement at that point.

5) Obtain Nal measurements.

- ✓ For floors, take a 60-second Nal measurement at 30 cm placing the detector (G-5 preferred or 44-17) in the holder and centering the detector over the sample location.
- ✓ For stairs, take a 30 second contact reading on each step.
- ✓ For walls, take a 30-second Nal measurement at 30 cm placing the detector (44-17 preferred) in the holder and centering the detector over the sample location. Take 30-second contact readings near wall penetrations (i.e., doorways) with elevated readings. Walls shall be surveyed by taking one measurement every 3 feet on center. No scanning is required.
- ✓ For ceilings, take a 60-second Nal measurement at 30 cm placing the 44-17 holder and centering the detector over the sample location. Ensure there is a tin back-shield on the detector.

Record all Floor and ceiling data using the grid number as the sample location number, as appropriate (i.e., specific assigned numbers for floors and ceilings. Use assigned wall and section numbers for walls. Use Stair Numbers on the attached drawing as the Sample numbers for stairs.

6) For all Nal measurements, mark area where detector was placed for each reading by circumscribing the area where the measurement was taken.

7) Note any items or conditions that may have affected any measurement in the "remarks" section of the data collection sheet.

In-Process Survey Requirements

| | Surface | Type of Survey | Detector | Placement | Scan Rate / Count Time |
|-------------------------|---------------------------------|------------------------|--|--|------------------------|
| Background | Block Walls | Background measurement | Ludlum 44-17 | 30 cm of wall in room 119, near column C-9. | 60 seconds |
| | Floors and Cement Walls | Background measurement | Bicron G-5 or Ludlum 44-17, as appropriate. | 30 cm of floor in room 106B, near column A-5. | 60seconds |
| | Metal ceilings and Metal stairs | Background measurement | Ludlum 44-17 | In manlift at waist level in Survey Unit. | 60 seconds |
| Scan | Floor | Total Alpha Activity | Preferred: Bicron G-5 Secondary: Ludlum 44-17 | ✓ Scan within 6" until highest reading is found | ~ 1 foot per second |
| | Stairs | Total Activity | Preferred: Ludlum 44-17 | Scan each step Within 6" until elevated reading is found | ~ 1 foot per second |
| | Walls | N/A | N/A | N/A | N/A |
| | Ceiling | Total Alpha Activity | Ludlum 44-17 | ✓ Scan Within 6" until elevated reading is found | ~ 1 foot per second |
| Nal Measurements | Floor | Total Alpha Activity | Preferred: Bicron G-5 Secondary: Ludlum 44-17 | 30 cm | 60seconds |
| | Stairs | Total Alpha Activity | Preferred: Ludlum 44-17 | On contact | 30 seconds |
| | Walls | Total Alpha Activity | Preferred: Ludlum 44-17 Secondary: Bicron G-5 | 30 cm. On contact to investigate elevated readings. | 30 seconds |
| | Ceiling | Total Alpha Activity | Ludlum 44-17 | 30 cm | 60 seconds |

Area V

Follow-up Survey Instructions For Walls Unit 6

Survey/ Sampling Instructions

Purpose:

This instruction provides guidance for collecting additional data needed to determine the contamination levels in Survey unit 776006. Work to be performed in accordance with "INS-535-Ludlum2350-1 with Sodium Iodide Detector" and RSP-7.01 and 7.02.

Equipment and materials:

- 1) A Ludlum 44-17 with side and back shields, attached to a Ludlum 2350-1.
- 2) HILTI PD 28 Laser range finder or Measuring tape that is at least 10 feet long.

Procedure:

1) RCT, ensure the instrument is functioning by using Americium source TS-912. Obtain one 60 second count at the beginning and end of each workday.

2) RCT, inspect instrument for obvious damage and perform a battery check on the instrument.

3) RCT, obtain a 60 second background measurement on contact with wall at survey unit 76006 final survey point #14 with tin side and back shields around detector.

4) NaI measurements will be taken on walls that have undergone remediation. At each location take a 30-second contact reading, centering the detector over the sample location (this would be the original 3'-on center grid location). The sample location is in the center of each grid. Ensure that tin side and back shields are secured around the detector.

Note if sample location is near ductwork or other items that may be the source of elevated readings in the remarks section.

5) Record results on the attached survey form. Also, ensure that all count times are appropriately recorded.

Summary of Survey Instructions

| Table -1 | | | | |
|---------------------------------|----------------|---------------------------|--|------------|
| Location | Type of Survey | Probe | Placement | Count time |
| Listed on attached spread sheet | Total Alpha | G-5 (preferred) or 44-17 | On contact with remediated locations in each grid. | 30 seconds |

Survey Instructions
Building 776 Area V
Survey Unit 776006

Purpose:

This instruction provides guidance for collecting gross gamma and removable contamination data to quantify the amount of residual contamination in Survey Unit 776006 prior to demolition. NaI measurements are performed in accordance with "INS-535-Ludlum2350-1 with Sodium Iodide Detector".

Equipment and materials:

1. A Ludlum 44-17 attached to a Ludlum 2350-1 set to collect five-minute counts that will be displayed on its LCD window.
2. A Bicron G-5 attached to a Ludlum 2350-1 set to collect five-minute counts that will be displayed on its LCD window.
3. One Electra with attached DP-6, calibrated and daily response checked.
4. Two probe holders, one for the G-5 and one for the 44-17 with tin shielding.
5. Calibrated and daily response checked SAC-4.
6. Measuring tape or laser range finder.

Note: The NE Electra with DP-6 probe and the Eberline SAC-4 shall be used in accordance with RSP- 7.01 and 7.02

Procedure:

1. Inspect instrument for obvious damage and ensure battery voltage is equal to or greater than 4.6 volts. If battery voltage is less than 4.6 volts change the batteries.
2. Complete daily performance checks for Sodium Iodide detectors to ensure the instrument is functioning properly by using Americium-241 source TS-912. Record results on Sodium Iodide Data Sheet.
3. For floor and concrete wall background measurements, perform a 300-second background count with a Bicron G-5 for floors or Ludlum 44-17 for walls at background location in the northeast corner of Room 404 in B777. Record background counts next to "Bkg Floor" or "Bkg Concrete Wall" in background column of attached "Sodium Iodide Data Collection" sheets as needed.
4. For block wall background measurements, perform a 300-second background count with a Ludlum 44-17 at background location in the north east corner of room 404. Record background counts next to "Bkg Block Wall" in background column of attached Sodium Iodide data collection sheets as needed.
5. For ceiling background measurements, perform a 300-second background count with a Ludlum 44-17 at background location in the north east corner of room 404. Hold the probe waist high, pointed toward ceiling using a sheet metal plate in front of the detector (take background measurement in this configuration). Record background counts next to "Bkg Metal Ceiling" in background column of attached Sodium Iodide data collection sheets as needed.
6. Mark the sample locations on the surfaces to be measured. Take all measurements on contact with the marked surface using tin side shields on the Bicron G-5 and tin side and back shields on the Ludlum 44-17. All Sodium Iodide readings shall have 300 second count times.
7. Collect sodium Iodide, total surface activity and removable surface activity measurements at all locations marked on the attached map.
8. Record the NaI and NE Electra measurements on the attached sheet. Note any items or conditions that may have affected the measurement in the "remarks" section.
9. Count swipes for 60 seconds with a SAC-4, record result on attached sheet for removable contamination.

Survey Instructions
Building 776 Area V
Survey Unit 776006

| Survey Requirements | | | | |
|-------------------------|------------------------|----------------------------|---|-------------|
| Surface | Type of Survey | Probe | Placement | Count Time |
| Floor | Total Alpha Activity | Bicron G-5 | On contact | 300 seconds |
| All Surfaces | Total Alpha Activity | Electra with DP-6 | On contact | 60 seconds |
| Block walls | Total Alpha Activity | Bicron G-5 or Ludlum 44-17 | On contact | 300 seconds |
| All Surfaces | Removable Alpha | SAC-4 | Swipe in placed in tray | 60 seconds |
| Ceiling | Total Alpha Activity | Ludlum 44-17 | On Contact | 300 seconds |
| Block Walls | Background measurement | Bicron G-5 or Ludlum 44-17 | On contact with wall at background location in room 404 | 300 seconds |
| Floors and cement walls | Background measurement | Bicron G-5 or Ludlum 44-17 | On contact with floor at background location in room 404. | 300 seconds |
| Metal ceilings | Background measurement | Ludlum 44-17 | Probe waist high, pointed toward ceiling with sheet metal plate at background location in room 404. | 300 seconds |

FINAL SURVEY REPORT

Survey Unit 776006

Introduction and Scope

This report is prepared to summarize preliminary and final surveys of survey unit 776006. The surveys have been performed to determine the extent of contamination in the survey unit. As a result of the low levels of contamination and the lack of remediation required for this survey unit, the final survey was performed in conjunction with the in-process survey. A PDS survey for survey unit 776006 has been completed in accordance with guidelines outlined in the "Radiological Pre-Demolition Survey Plan Building 776/777". Based on the results it is recommended that no further remediation is needed, and that the survey unit may be encapsulated in preparation for demolition. Isolation controls shall be put in place to prevent re-contamination of the area. This report has been prepared in accordance with sections 3 and 8 of the "Radiological Pre-Demolition Survey Plan Building 776/777".

Survey unit 776006 includes room 139, which is the stairwell that runs from the basement to the 2nd floor. Also included in this survey unit is the basement floor area in front of the elevator.

In-process Survey Methods and Techniques

Surfaces were evaluated for potential contamination using sodium iodide (NaI) detectors attached to single channel analyzers windowed for the 59 keV gamma-ray (^{241}Am). The background measurements were taken near column A-5 in room 106B. This location was found to have lower NaI readings than the standard background location on the first floor

Measurements were taken at 30 cm. and on contact. For the 30-cm. measurements on the floors and ceilings, the survey technique involved scanning each grid location to find the highest reading and then taking the measurement at that point. For the 30-cm. measurements on the walls, the reading was taken at the center of each grid; this provides 100% coverage of the walls. In addition, contact measurements were taken on contact every 10 feet on the top of block walls.

Survey measurements on the floors, and ceilings were taken on an established 10-ft.x10-ft. grid pattern. Measurements on the walls were taken on an established 3ft by 3ft grid pattern.

PDS Methods and Techniques

The PDS survey results determine the Average Surface Contamination Value (ASCV₀) and source term for the survey unit. These parameters are used to determine whether the building may be demolished within the limits outlined in the "Radiological Pre-Demolition Survey Plan Building 776/777".

To comply with the "Radiological Pre-Demolition Survey Plan Building 776/777", a minimum of 30 survey points were selected per survey unit. A random start, systematic grid method was used to identify the survey point locations. Three types of surveys are performed at each survey point as follows:

- Painted surfaces are evaluated for potential contamination under coatings using sodium iodide (NaI) gamma detectors attached to a single channel analyzer windowed for the 59 keV gamma-ray (^{241}Am).
- Direct alpha surface contamination measurements are performed using a NE Electra survey instrument with attached DP-6 probe. This data may be compared to the NaI survey data to show the fraction of contamination that is directly on the surface verses imbedded in the material matrix.

FINAL SURVEY REPORT

Survey Unit 776006

- Removable surface alpha contamination surveys were performed by swiping the survey point with a 47mm filter paper then counting the filter paper on a SAC-4 alpha counter. This data may be used to determine the effectiveness of encapsulation following the PDS.

To conservatively determine the final Average Surface Contamination Value (ASCV_u) for the survey unit, the source term associated with inaccessible areas of the survey unit (as described below) is added to the source term calculated by the PDS survey.

ALARA Post-Remediation Surveys

Accessible Areas

In addition to the PDS used to determine the Average Surface Contamination Value (ASCV_u) and source term for the survey unit, surveys were taken to determine the effectiveness of remediation efforts. Remediation is performed to demonstrate a reasonable best effort is made to maintain releases to the environment and dose to the workers ALARA.

Floors

The floors of survey unit 776006 consist of epoxy covered concrete. In-process measurements collected on the floor of 776006 showed that a majority of the basement floor area had elevated activity. The contaminated portions of the floor surface of the survey unit were remediated by shaving before being re-surveyed. Remediation of the elevated floor areas resulted in a decontamination factor (DF) of 3.8 or a source term reduction of 73.5%.

Table 1
Floor Remediation Results

| | Pre-Remediation | Post-Remediation |
|-----------------------------------|-----------------|------------------|
| Maximum (dpm/100cm ²) | 1,192,957 | 210,144 |
| Average (dpm/100cm ²) | 485,190 | 128,604 |

Walls

Survey measurements on the walls of survey unit 776006 were taken on an established 3-ft. by 3-ft. grid on each of the wall sections within the survey unit. The average contamination on all of the walls was <100,000 dpm/100cm². Some of the walls showed average contamination values >100,000 dpm/100cm². Follow-up survey results showed numerous spots of contamination on the wall with elevated values >100,000 dpm/100cm². Shaving was performed on the elevated wall surfaces and follow-up survey performed. The remediation on wall 3 was marginally effective, but the average contamination level was only reduced to 199,770 dpm/100cm². The range of contamination on wall 3 is from 3,774 to 10,064,965 dpm/100cm². The contamination is spotty and appears to be at depth. This is a structural wall, and cannot be removed prior to building demolition. It has been painted to indicate the requirement for special handling during building demolition.

FINAL SURVEY REPORT

Survey Unit 776006

Table 2
B776/777 Survey Unit 776006 - Wall Summary

| Wall | Initial Characterization (Average dpm/100 cm ²) | | | Follow-up Characterization (Average dpm/100 cm ²) | | |
|-----------|--|---------|----------|--|---------|----------|
| | Type I | Type II | Type III | Type I | Type II | Type III |
| 776006-1 | 77,130 | | | 77,130 | | |
| 776006-2 | 69,438 | | | 69,438 | | |
| 776006-3 | 229,612 | | | | 199,770 | |
| 776006-4 | 78,542 | | | 78,542 | | |
| 776006-5 | 18,762 | | | 18,762 | | |
| 776006-7 | 25,514 | | | 25,514 | | |
| 776006-8 | 17,228 | | | 17,228 | | |
| 776006-9 | 30,952 | | | 30,952 | | |
| 776006-10 | 9,174 | | | 9,174 | | |
| 776006-11 | 40,829 | | | 40,829 | | |
| 776006-13 | 9,762 | | | 9,762 | | |
| 776006-14 | 55,195 | | | 55,195 | | |
| 776006-15 | 29,867 | | | 29,867 | | |
| | Type I: | | | | | |
| | Type II: | | | | | |
| | Type III: | | | | | |

Ceilings

Survey measurements revealed that all accessible ceiling surfaces in the survey unit are <100,000 dpm/100cm².

Inaccessible Areas

Floors

Cracks

It is conservatively assumed that the contamination is uniformly distributed on both sides of each crack or seam and the contamination on the bottom of the crack or seam is the same magnitude as the contamination measured at the surface.

Approximately 45 linear feet (13.7 meters) of contaminated cracks was identified at the base of the stairs in survey unit 776008 at an average contamination level of 732,000 dpm/100 cm². Since the contamination is in a support wall, remediation was not performed. The amount of activity remaining in the cracks is estimated as:

$$(2 * 13.7 \text{ m} * 0.15 \text{ m} * 732,000 \text{ dpm/100 cm}^2 * 10,000 \text{ cm}^2/\text{m}^2) / (1 \mu\text{Ci}/2.22\text{E}6 \text{ dpm}) = 135.5 \mu\text{Ci}$$

Walls/Ceilings

The inaccessible areas of the walls and ceilings have the same or less potential for contamination as the accessible areas of the floors, walls and ceilings of survey unit 776006 and therefore were not evaluated. The spotty contamination on wall 3 does not effect the survey unit source term significantly, and is considered incidental.

FINAL SURVEY REPORT

Survey Unit 776006

Stairs

The stair steps in this stairwell are highly contaminated. Contact readings on the top surface of each tread revealed significant amounts of fixed contamination (Up to 200,283,564 dpm/100 cm²). Since access is required to the basement and 2nd floor, and all of the stairs in each stairwell in the building are similarly contaminated, the stairs will remain in place until just prior to building demolition. They will then be removed and packaged prior to building demolition. Therefore, the stairs will not be included in the source term inventory for this survey unit.

PDS Data Summary

The values for the accessible areas and inaccessible areas were summed and divided by the total area for the survey unit to calculate the "Average Surface Contamination Value" (ASCV_u) and source term for the survey unit. The results are summarized in Table 3 below:

Table 3:
PDS Final Results

| | Final Results |
|--|----------------------|
| 776006 Inaccessible Area Source Term (μCi) | 135.5 |
| 776006 Accessible Area Source Term (μCi) | 573.8 |
| 776006 Total Source Term (μCi) | 709.3 |
| Survey Unit Wall, Ceiling, and Floor Area (m²) | 438 |
| (ASCV_u) (μCi/m²) | 1.62 |
| (ASCV_u) (dpm/100cm²) | 35,964 |

Attachment 1

Standard Method for Calculating the ASCV for Each Survey Unit

Prerequisites:

1. Final survey map for the survey unit
2. PDS survey results
3. Survey information used to estimate activities in inaccessible areas;
4. Survey information for any structural members or elevated regions not represented by the PDS survey.

Conversions:

1 square meter (m^2) = $100 \times 100 \text{ cm}^2$

1 microcurie (μCi) = $2.22 \times 10^6 \text{ dpm}$

1 ($\mu\text{Ci}/m^2$) = $22,200 \text{ dpm}/100\text{cm}^2$ evenly distributed over one square meter.

12 inches = 1 foot = 0.305 meters

Calculations:

Accessible Area Inventory

1. Calculate the average surface contamination for the applicable survey unit from a minimum of 30 sodium iodide measurements obtained by the PDS survey.
2. Average the total surface contamination activity present.
3. Convert the average surface contamination value from step 2 from " $\text{dpm}/100\text{cm}^2$ " to " $\mu\text{Ci}/m^2$ "

Example:

$$22,200 \text{ dpm}/100\text{cm}^2 \times (100 \times 100 \text{ cm}^2/m^2) \times (1\mu\text{Ci}/2.22 \times 10^6 \text{ dpm}) = 1 \mu\text{Ci}/m^2$$

4. Obtain surface area of survey unit from title box of final survey map. This is reported in square meters.
5. Calculate inventory for accessible areas

The surface area from a survey unit map title box is 1,000 square meters and the average contamination level from the 30 PDS points is $22,200 \text{ dpm}/100\text{cm}^2$.

Example:

$$1,000 m^2 \times 22,200 \text{ dpm}/100\text{cm}^2 \times (100 \times 100 \text{ cm}^2/m^2) \times (1\mu\text{Ci}/2.22 \times 10^6 \text{ dpm}) = 1,000 \mu\text{Ci}$$

Inaccessible Area Inventory

1. Document methods used to estimate contamination levels and potential inventory in seams, cracks or other surfaces in the final survey report. Provide an estimated remaining inventory for each item/area in the report.

Example:

There are 20 feet of seams contaminated to an average level of $2,220,000 \text{ dpm}/100 \text{ cm}^2$. Each seam has two sides. The total inventory can be estimated assuming the contamination levels measured at the top of the seam extend down each side of the seam. The depth of the seam can be determined from design drawings or from direct observation as the seam is chipped away. If a seam is determined to be 4 inches deep, then the inventory of the seam can be calculated as follows:

The contaminated area of the seam is:

$$(20 \text{ feet} \times .305 \text{ m/ft}) \times (.3 \text{ feet} \times 0.305 \text{ m/ft}) = .61 m^2 \times 2 \text{ sides} = 1.22 m^2$$

Therefore the inventory in the seam in μCi is:

$$1.22 m^2 \times (2,220,000 \text{ dpm}/100 \text{ cm}^2) \times (10,000 \text{ cm}^2/m^2) \times \mu\text{Ci}/2.22E6 \text{ dpm} = 122 \mu\text{Ci}$$

Attachment 1

Calculating the ASCV

1. Sum the inventories from the inaccessible areas with the inventory for the accessible area to obtain a total inventory for the survey unit.

Total Inventory = Accessible Inventory + Inaccessible inventory + Inventory items (areas not represented by other inventories listed i.e. Stairs, columns, etc)

Example: 1000 μCi = accessible inventory

122 μCi = inaccessible inventory

100 μCi = inaccessible contamination in the columns and contamination on the stairs

$1000 + 122 + 100 = 1222 \mu\text{Ci}$

2. Divide the total inventory for the survey unit by the accessible area of the survey unit obtained from the final survey map.

Example: 1222 μCi = total inventory

1000 m^2 = total surface area of the survey unit

$1222 \mu\text{Ci} / 1,000 \text{ m}^2 = 1.22 \mu\text{Ci} / \text{m}^2$

$1.22 \mu\text{Ci} / \text{m}^2 * (1 \text{ m}^2 / (100 * 100 \text{ cm}^2)) * (2.22 \text{E}6 \text{ dpm} / \mu\text{Ci}) = 27084 \text{ dpm} / 100 \text{ cm}^2$

Total Surface Activity

| | | | | | | | |
|-------------------|----------|-------------------------|------------------|-----|-------------|----------------------------|---------|
| Survey Area: | | V | Survey Unit: | | 776006 | | |
| Meter Model: | | NE Electra w/ DP6 Probe | | | | Date: | 1/23/05 |
| | | 1 | 2 | 3 | | | |
| Instrument #: | | 2093 | N/A | N/A | N/A | A priori MDA: | 94 |
| Cal. Due Date: | | 1/31/05 | N/A | N/A | N/A | Avg. Local Bkgd | 41.7 |
| Efficiency (c/d): | | 1/0/00 | N/A | N/A | N/A | Avg. Efficiency | 0.215 |
| Sample Location # | RCT ID # | Inst. # | Local Bkgd (cpm) | | Gross (cpm) | (dpm/100 cm ²) | |
| 1 | 1 | 1 | 24 | | 170.0 | 679.1 | |
| 2 | 2 | 1 | 13 | | 30.0 | 79.1 | |
| 3 | 1 | 1 | 12 | | 26.0 | 65.1 | |
| 4 | 3 | 1 | 9 | | 29.0 | 93.0 | |
| 5 | 1 | 1 | 14 | | 31.0 | 79.1 | |
| 6 | 2 | 1 | 18 | | 28.0 | 46.5 | |
| 7 | N/A | N/A | N/A | | N/A | N/A | |
| 8 | N/A | N/A | N/A | | N/A | N/A | |
| 9 | N/A | N/A | N/A | | N/A | N/A | |
| 10 | N/A | N/A | N/A | | N/A | N/A | |
| 11 | 1 | 1 | 11 | | 44.0 | 153.5 | |
| 12 | 2 | 1 | 16 | | 21.0 | 23.3 | |
| 13 | 1 | 1 | 19 | | 25.0 | 27.9 | |
| 14 | 2 | 1 | 25 | | 30.0 | 23.3 | |
| 15 | 1 | 1 | 13 | | 17.0 | 18.6 | |
| 16 | 2 | 1 | 11 | | 111.0 | 465.1 | |
| 17 | 1 | 1 | 12 | | 322.0 | 1441.9 | |
| 18 | 2 | 1 | 19 | | 24.0 | 23.3 | |
| 19 | 1 | 1 | 17 | | 21.0 | 18.6 | |
| 20 | 2 | 1 | 11 | | 10.0 | -4.7 | |
| 21 | 1 | 1 | 5 | | 18.0 | 60.5 | |
| 22 | 2 | 1 | 9 | | 11.0 | 9.3 | |
| 23 | 1 | 1 | 10 | | 23.0 | 60.5 | |
| 24 | 2 | 1 | 7 | | 7.0 | 0.0 | |
| 25 | 1 | 1 | 7 | | 11.0 | 18.6 | |
| 26 | 2 | 1 | 12 | | 10.0 | -9.3 | |
| 27 | 1 | 1 | 22 | | 26.0 | 18.6 | |
| 28 | 2 | 1 | 8 | | 10.0 | 9.3 | |
| 29 | 1 | 1 | 7 | | 14.0 | 32.6 | |
| 30 | 2 | 1 | 6 | | 16.0 | 46.5 | |
| | | | | | MIN | -9.3 | |
| | | | | | MAX | 1,441.9 | |
| | | | | | MEAN | 133.8 | |
| | | | | | SD | 307.0 | |

Removable Activity

| | | | | | |
|-----------------------|---------------|---------------|--------------|------|----------------------------|
| Survey Area: | | V | Survey Unit: | | 776006 |
| Dates Counted: | 1/23/05 | | | | |
| A priori MDA: | 16 | | | | |
| Efficiency (c/d) | 0.333 | | | | |
| Smear Location Number | Smear Results | | | | |
| | RCT ID # | Serial Number | Gross (cpm) | Bkg. | (dpm/100 cm ²) |
| 1 | 1 | 953 | 6 | 0.6 | 16 |
| 2 | 2 | 964 | 3 | 0.1 | 9 |
| 3 | 1 | 1411 | 1 | 0.1 | 3 |
| 4 | 2 | 953 | 0 | 0.6 | -2 |
| 5 | 1 | 964 | 2 | 0.1 | 6 |
| 6 | 2 | 1411 | 3 | 0.1 | 9 |
| 7 | N/A | N/A | N/A | N/A | N/A |
| 8 | N/A | N/A | N/A | N/A | N/A |
| 9 | N/A | N/A | N/A | N/A | N/A |
| 10 | N/A | N/A | N/A | N/A | N/A |
| 11 | 1 | 953 | 0 | 0.6 | -2 |
| 12 | 2 | 964 | 0 | 0.1 | 0 |
| 13 | 1 | 1411 | 0 | 0.1 | 0 |
| 14 | 2 | 953 | 15 | 0.6 | 43 |
| 15 | 1 | 964 | 5 | 0.1 | 15 |
| 16 | 2 | 1411 | 7 | 0.1 | 21 |
| 17 | 1 | 953 | 28 | 0.6 | 82 |
| 18 | 2 | 964 | 2 | 0.1 | 6 |
| 19 | 1 | 1411 | 8 | 0.1 | 24 |
| 20 | 2 | 953 | 0 | 0.6 | -2 |
| 21 | 1 | 964 | 3 | 0.1 | 9 |
| 22 | 2 | 1411 | 0 | 0.1 | 0 |
| 23 | 1 | 953 | 1 | 0.6 | 1 |
| 24 | 2 | 964 | 0 | 0.1 | 0 |
| 25 | 1 | 1411 | 3 | 0.1 | 9 |
| 26 | 2 | 953 | 2 | 0.6 | 4 |
| 27 | 1 | 964 | 2 | 0.1 | 6 |
| 28 | 2 | 1411 | 1 | 0.1 | 3 |
| 29 | 1 | 953 | 1 | 0.1 | 3 |
| 30 | 2 | 964 | 0 | 0.6 | -2 |
| | | | | 0.1 | -1.8 |
| | | | | MAX | 82.3 |
| | | | | MEAN | 9.9 |
| | | | | SD | 17.9 |

Note: Data points 7,8,9, &10 were inaccessible. No data available.

Sodium Iodide Instrument Information

| | | | | | |
|--------------|---|--------------|--------|-----------------|----------|
| Survey Area: | V | Survey Unit: | 776006 | Survey Date(s): | 01/14/05 |
|--------------|---|--------------|--------|-----------------|----------|

Instrument Specifications

| Instrument # | 1 | 2 |
|-----------------------------------|---------------|---------------|
| Meter Model: | Ludlum 2350-1 | Ludlum 2350-1 |
| Meter Serial #: | 201199 | 203457 |
| Detector Model: | Ludlum 44-17 | Bicron G-5 |
| Detector #: | 199764 | B940T |
| Detector Size (cm ²): | 17.8 | 125 |
| Calibration Due Date: | 5/2/05 | 6/8/05 |
| Count Time (min) | 5 | 5 |
| Contact Efficiency | 9.20% | 5.60% |

Ratio Used

| | |
|---------------|---|
| Pu to Am -241 | 8 |
|---------------|---|

Comments

In cases where the critical level is greater than the calculated dpm/100cm², the critical level will be used for statistical analysis.

Count Times for backgrounds and samples are equal.

Attenuation Factors: Based on observation of Walls and Ceilings. Epoxy on Floor determined by chip sampling.

Background (Gross)

| Instrument # | 1 | 2 |
|------------------------|-----|-------|
| Gamma (Concrete walls) | N/A | N/A |
| Gamma (Floors) | N/A | 12953 |
| Gamma (Walls) | 996 | N/A |

Background (cpm)

| Instrument # | 1 | 2 |
|------------------------|-------|--------|
| Gamma (Concrete walls) | N/A | N/A |
| Gamma (Floors) | N/A | 2590.6 |
| Gamma (Walls) | 199.2 | N/A |

Efficiencies (cpm/dpm)

| Instrument # | 1 | 2 |
|---------------|-------|-------|
| Thin/No Paint | 0.091 | 0.055 |
| Epoxy | 0.074 | 0.045 |
| Other | 0.060 | 0.036 |

Coatings

| | Thickness (inches) |
|---------------|--------------------|
| Thin/No Paint | 0.015 |
| Epoxy | 0.250 |
| Other | 0.5 |

Sodium Iodide Instrument Information

| | | | | | |
|--------------|---|--------------|--------|-----------------|----------|
| Survey Area: | V | Survey Unit: | 776006 | Survey Date(s): | 01/14/05 |
|--------------|---|--------------|--------|-----------------|----------|

Instrument Specifications

| Instrument # | 1 | 2 |
|-----------------------------------|---------------|-----|
| Meter Model: | Ludlum 2350-1 | N/A |
| Meter Serial #: | 201199 | N/A |
| Detector Model: | Ludlum 44-17 | N/A |
| Detector #: | 199764 | N/A |
| Detector Size (cm ²): | 17.8 | N/A |
| Calibration Due Date: | 5/2/05 | N/A |
| Count Time (min) | 5 | N/A |
| Contact Efficiency | 9.20% | N/A |

Ratio Used

| | |
|----------------|---|
| Pu to Am - 241 | 8 |
|----------------|---|

Comments

In cases where the critical level is greater than the calculated dpm/100cm², the critical level will be used for statistical analysis.

Count Times for backgrounds and samples are equal.

Attenuation Factors: Based on observation of Walls and Ceilings. Epoxy on Floor determined by chip sampling.

Background (Gross)

| Instrument # | 1 | 2 |
|------------------|------|-----|
| Gamma (Ceilings) | N/A | N/A |
| Gamma (Floors) | N/A | N/A |
| Gamma (Walls) | 1467 | N/A |

Background (cpm)

| Instrument # | 1 | 2 |
|------------------|-------|-----|
| Gamma (Ceilings) | N/A | N/A |
| Gamma (Floors) | N/A | N/A |
| Gamma (Walls) | 293.4 | N/A |

Efficiencies (cpm/dpm)

| Instrument # | 1 | 2 |
|---------------|-------|---------|
| Thin/No Paint | 0.091 | #VALUE! |
| Epoxy | 0.074 | #VALUE! |
| Other | 0.087 | #VALUE! |

Coatings

| | Thickness (inches) |
|---------------|--------------------|
| Thin/No Paint | 0.015 |
| Epoxy | 0.250 |
| Other | 0.06 |

Total Activity Estimates Using Sodium Iodide Instruments

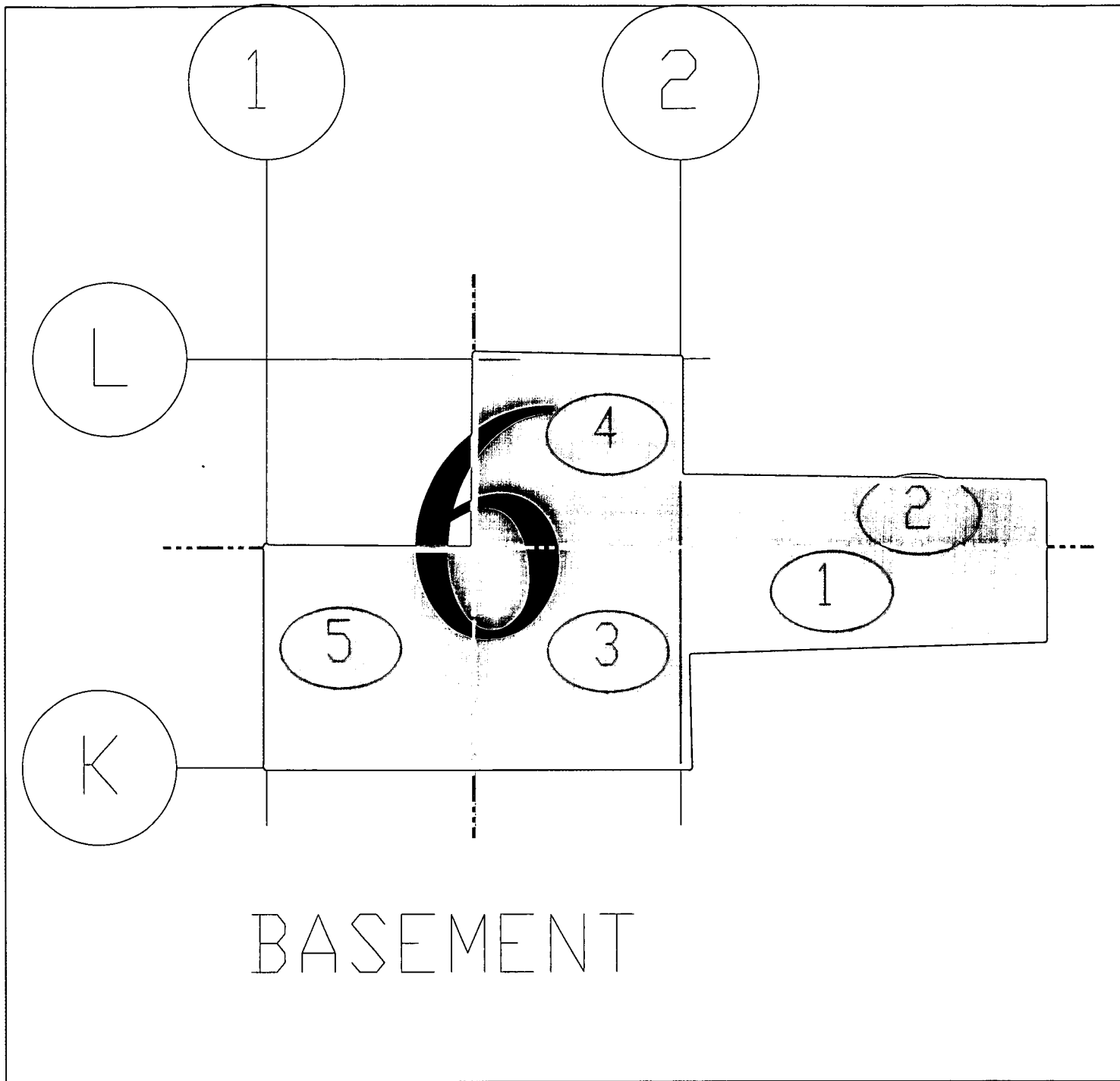
| Survey Area: | | V | Survey Unit: | 776006 | Survey Date(s): | 01/14/05 |
|--------------|-------------------|----------|--------------|--------------|--------------------------------|-----------------------------|
| | | | | | Critical Level (dpm/100cm2) | Total Alpha (dpm/100cm2) |
| Surface | Sample Location # | RCT ID # | Instrument # | Gross Counts | | |
| Wall | 1 | 1 | 1 | 1,979 | 8,819 | 50,672 |
| Wall | 2 | 1 | 1 | 1,619 | 8,819 | 15,043 |
| N/A | 3 | N/A | N/A | N/A | N/A | N/A |
| N/A | 4 | N/A | N/A | N/A | N/A | N/A |
| Wall | 5 | 2 | 1 | 1,317 | 8,819 | 8,819 |
| Wall | 6 | 2 | 1 | 1,664 | 8,819 | 19,497 |
| Wall | 7 | 1 | 1 | 1,713 | 8,819 | 24,346 |
| Wall | 8 | 1 | 1 | 1,444 | 8,819 | 8,819 |
| Wall | 9 | 1 | 1 | 1,351 | 8,819 | 8,819 |
| Wall | 10 | 1 | 1 | 1,812 | 8,819 | 34,144 |
| Wall | 11 | 1 | 1 | 1,485 | 8,819 | 8,819 |
| Wall | 12 | 1 | 1 | 1,672 | 8,819 | 20,289 |
| N/A | 13 | N/A | N/A | N/A | N/A | N/A |
| Wall | 14 | 1 | 1 | 1,575 | 8,819 | 10,689 |
| Wall | 15 | 1 | 1 | 1,724 | 8,819 | 25,435 |
| Wall | 16 | 2 | 1 | 1,349 | 8,819 | 8,819 |
| Wall | 17 | 2 | 1 | 1,770 | 8,819 | 29,988 |
| Wall | 18 | 1 | 1 | 1,671 | 8,819 | 20,190 |
| Wall | 19 | 1 | 1 | 1,564 | 8,819 | 9,600 |
| N/A | 20 | N/A | N/A | N/A | N/A | N/A |
| N/A | 21 | N/A | N/A | N/A | N/A | N/A |
| N/A | 22 | N/A | N/A | N/A | N/A | N/A |
| Wall | 23 | 1 | 1 | 2,283 | 8,819 | 80,759 |
| Wall | 24 | 2 | 1 | 1,741 | 8,819 | 27,118 |
| Wall | 25 | 2 | 1 | 1,085 | 8,819 | 8,819 |
| Wall | 26 | 2 | 1 | 1,486 | 10,788 | 10,788 |
| Wall | 27 | 2 | 1 | 2,037 | 10,788 | 69,010 |
| Wall | 28 | 2 | 1 | 1,855 | 10,788 | 46,975 |
| N/A | 29 | N/A | N/A | N/A | N/A | N/A |
| Wall | 30 | 1 | 1 | 1,918 | 10,788 | 54,602 |

Total Activity Estimates Using Sodium Iodide Instruments

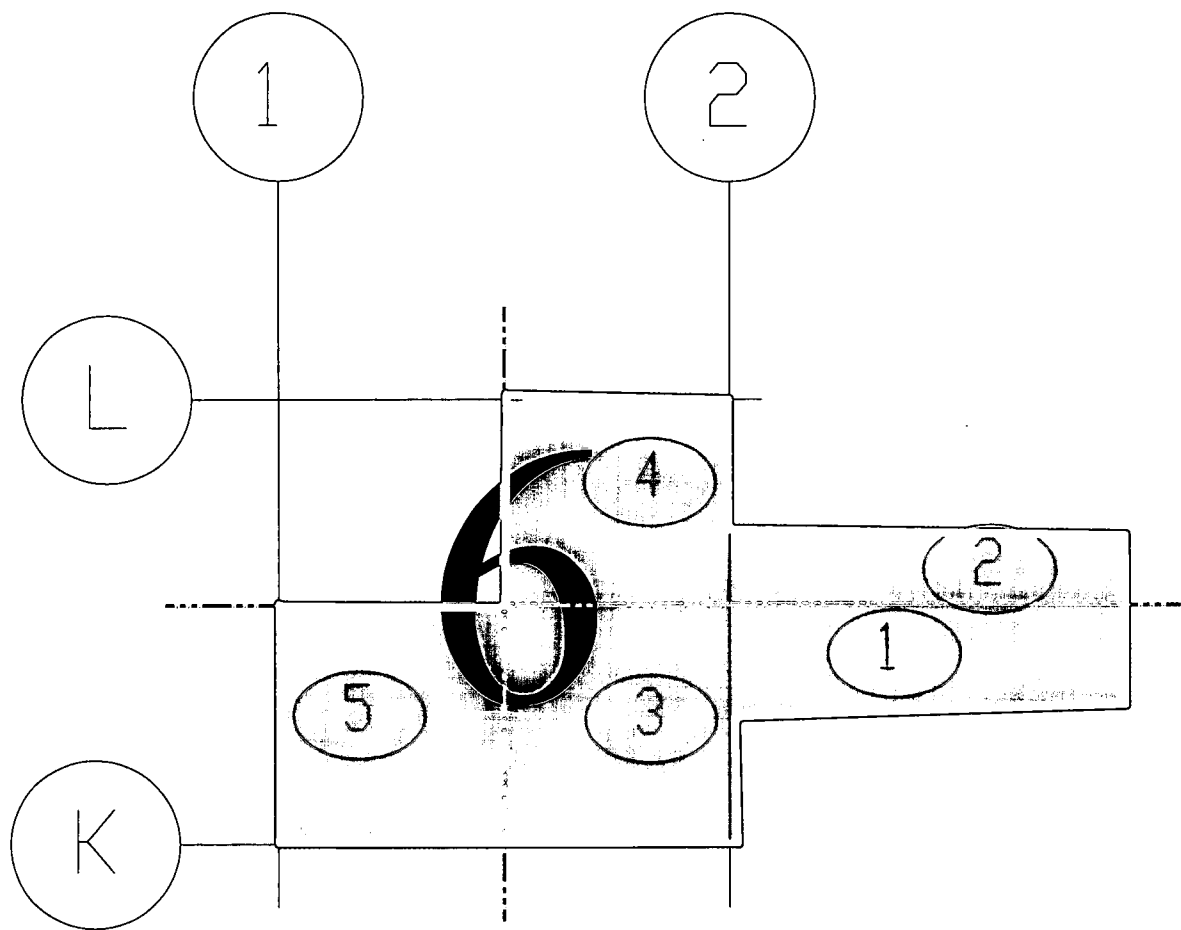
| Survey Area: V Survey Unit: 776006 Survey Date(s): 01/14/05 | | | | | | |
|---|-------------------|----------|--------------|--------------|---|--|
| Surface | Sample Location # | RCT ID # | Instrument # | Gross Counts | Critical Level (dpm/100cm ²) | Total Alpha (dpm/100cm ²) |
| N/A | 1 | N/A | N/A | N/A | N/A | N/A |
| N/A | 2 | N/A | N/A | N/A | N/A | N/A |
| Floor | 3 | 1 | 2 | 14268 | 6,130 | 30,446 |
| Floor | 4 | 1 | 2 | 13924 | 6,130 | 22,482 |
| N/A | 5 | N/A | N/A | N/A | N/A | N/A |
| N/A | 6 | N/A | N/A | N/A | N/A | N/A |
| N/A | 7 | N/A | N/A | N/A | N/A | N/A |
| N/A | 8 | N/A | N/A | N/A | N/A | N/A |
| N/A | 9 | N/A | N/A | N/A | N/A | N/A |
| N/A | 10 | N/A | N/A | N/A | N/A | N/A |
| N/A | 11 | N/A | N/A | N/A | N/A | N/A |
| N/A | 12 | N/A | N/A | N/A | N/A | N/A |
| Floor | 13 | 1 | 2 | 12405 | 6,130 | 6,130 |
| N/A | 14 | N/A | N/A | N/A | N/A | N/A |
| N/A | 15 | N/A | N/A | N/A | N/A | N/A |
| N/A | 16 | N/A | N/A | N/A | N/A | N/A |
| N/A | 17 | N/A | N/A | N/A | N/A | N/A |
| N/A | 18 | N/A | N/A | N/A | N/A | N/A |
| N/A | 19 | N/A | N/A | N/A | N/A | N/A |
| Wall | 20 | 1 | 1 | 1190 | 7,266 | 19,200 |
| Wall | 21 | 1 | 1 | 1117 | 7,266 | 11,975 |
| Wall | 22 | 1 | 1 | 2108 | 7,266 | 110,054 |
| N/A | 23 | N/A | N/A | N/A | N/A | N/A |
| N/A | 24 | N/A | N/A | N/A | N/A | N/A |
| N/A | 25 | N/A | N/A | N/A | N/A | N/A |
| N/A | 26 | N/A | N/A | N/A | N/A | N/A |
| N/A | 27 | N/A | N/A | N/A | N/A | N/A |
| N/A | 28 | N/A | N/A | N/A | N/A | N/A |
| Floor | 29 | 1 | 2 | 15503 | 7,499 | 72,225 |
| N/A | 30 | N/A | N/A | N/A | N/A | N/A |

Nal Activity Measurements

| Sample # | Surface | RCTID# | Instrument # | (dpm/100 cm ²) |
|----------|---------|--------|--------------|----------------------------|
| 1 | Wall | 1 | 1 | 50,672 |
| 2 | Wall | 1 | 1 | 15,043 |
| 3 | Floor | 1 | 2 | 30,446 |
| 4 | Floor | 1 | 2 | 22,482 |
| 5 | Wall | 2 | 1 | 8,819 |
| 6 | Wall | 2 | 1 | 19,497 |
| 7 | Wall | 1 | 1 | 24,346 |
| 8 | Wall | 1 | 1 | 8,819 |
| 9 | Wall | 1 | 1 | 8,819 |
| 10 | Wall | 1 | 1 | 34,144 |
| 11 | Wall | 1 | 1 | 8,810 |
| 12 | Wall | 1 | 1 | 20,289 |
| 13 | Floor | 1 | 2 | 6,130 |
| 14 | Wall | 1 | 1 | 10,689 |
| 15 | Wall | 1 | 1 | 25,345 |
| 16 | Wall | 2 | 1 | 8,819 |
| 17 | Wall | 2 | 1 | 29,988 |
| 18 | Wall | 1 | 1 | 20,190 |
| 19 | Wall | 1 | 1 | 9,600 |
| 20 | Wall | 1 | 1 | 19,200 |
| 21 | Wall | 1 | 1 | 11,975 |
| 22 | Wall | 1 | 1 | 110,054 |
| 23 | Wall | 1 | 1 | 80,759 |
| 24 | Wall | 2 | 1 | 27,118 |
| 25 | Wall | 2 | 1 | 8,819 |
| 26 | Wall | 2 | 1 | 10,788 |
| 27 | Wall | 2 | 1 | 69,010 |
| 28 | Wall | 2 | 1 | 46,975 |
| 29 | Floor | 1 | 2 | 72,225 |
| 30 | Wall | 1 | 1 | 54,602 |
| | | | Min | 6,130 |
| | | | Max | 110,054 |
| | | | Average | 29,149 |
| | | | SD | 25,671 |



UNIT 6 FLOOR



BASEMENT

UNIT 6 CEILING

RADIOLOGICAL CLOSEOUT SURVEY FOR THE 776 CLUSTER

Survey Area: V

Survey Unit: 776006

Classification: NA

Building: 776

Survey Unit Description: Basement Room 003, 002 and Room 139 stairway

Total Floor Area: 37 sq. m

Total Area: 438 sq. m

Random Start Grid Size: 3 x 3 sq. m

SURVEY UNIT 776006 - MAP 1 OF 1

